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## ABSTRACTS

from

## TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

### A Saline Alkali Soil in Manchuria.

(pp. 809～814)

By R. KAWASHIMA and M. NAGATA.

(Agr. Chem. Laboratory, Kyushu Imperial University; Aug. 17, 1939.)

In this paper the morphological and some chemical natures of a saline alkali soil, strongly influenced by underground water, have been described. The place examined lies 65 km west of Harbin.

The amounts of soluble salts in an extract of soil-water ratio 1 : 20 are given in table I.

Table I. Soluble salts in milliequivalents per 100 g soil.

| Layer | Thickness (cm) | Anions | | | | | Cations | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $SO_4$ | Cl | $CO_3$ | $HCO_3$ | Total | Ca | Mg | K | Na | Total |
| $A_1$ | 20 | 1.40 | 0.09 | 0.49 | 3.77 | 5.75 | 1.78 | 0.46 | 0.12 | 2.78 | 5.14 |
| $A_2$ | 38 | 1.20 | 0.09 | 0.76 | 4.26 | 6.31 | 0.82 | 0.89 | 0.13 | 4.31 | 6.15 |
| $G_1$ | 36 | 0.87 | 0.15 | 0.95 | 5.64 | 7.61 | 0.30 | 0.39 | 0.09 | 6.26 | 7.04 |
| $G_2$ | 66 | 1.43 | 0.16 | 1.36 | 6.31 | 9.26 | 0.75 | 0.34 | 0.18 | 7.96 | 9.23 |

As in the above table the concentration of soluble salts in A-layer is much lower than that of G-layer and the per centage composition of divalent cations is much higher than that of G-layer.

Next, the pH-values and amounts of exchangeable cations are indicated in table II.

The base status of $A_1$-layer is typical of a calcium soil, and that of $A_2$-layer still preserves a good supply of divalent cations and shows no appreciable alkalinisation. Therefore, the soil conditions of A-layer are considered favourable. In

Table II. Exchangeable cations in milliequivalents per 100 g soil.

| Layer | pH | Cations | | | | | Per cents of equivalents | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Ca | Mg | K | Na | Totat | Ca | Mg | K | Na |
| $A_1$ | 8.36 | 28.25 | 0.65 | 0.26 | 0.58 | 29.74 | 95.0 | 2.2 | 0.9 | 1.9 |
| $A_2$ | 8.75 | 19.33 | 6.66 | 0.14 | 1.81 | 27.94 | 69.2 | 23.8 | 0.5 | 6.5 |
| $G_1$ | 9.19 | 10.81 | 8.17 | 0.25 | 5.91 | 25.14 | 43.0 | 32.5 | 1.0 | 23.5 |
| $G_2$ | 9.37 | 7.03 | 6.26 | 0.22 | 7.35 | 20.86 | 33.7 | 30.0 | 1.1 | 35.2 |

spite of the deleterious character of G-layer, the reclamation of this soil will be successful.

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## On the Acid Mineral Soil in South-Manchuria.

(pp. 815～818)

By R. KAWASHIMA.

(Agr. Chem. Laboratory, Kyushu Imperial University; Aug. 14, 1939.)

An acid mineral soil of low lime saturation is widely distributed along the coastal region of South-Manchuria.

Owing to the influence of herbaceous covering the acidity of surface soil is generally weaker than that of the subsoil

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## On the Application of Hydrogen Peroxide for Brewing.

(pp. 819～830)

### Part VI. On the effect of hydrogen peroxide on growth or multiplication of micro-organisms.

By Hisao MATUI and Masakazu YAMADA.

(The Governmental Institute of Brewing, Takinogawa, Tokyo;
Received July 19, 1939.)

Hydrogen peroxide has the effect to prevent the propagation of micro-organisms. The present authors have studied the behaviour of hydrogen peroxide upon the micro-organisms of the brewing use.

The saké yeast and the distillery yeast or kōzi fungi (*Aspergillus oryzae*) was inoculated in kōzi-extract of 10° Bllg. containing 1/10000～3/1000 part of 35% hydrogen peroxide, then incubated at 27～30°C. In these conditions the saké yeast could not propagate itself in the medium containing 8/10000 part of 35% hydrogen peroxide (ca. 0.028% $H_2O_2$) and the distillery yeast failed to proliferate in the medium containing 7/10000 part of 35% hydrogen peroxide (ca. 0.024%

$H_2O_2$), while the kōzi fungi was so resistant to hydrogen peroxide, that it could not be prevented from germinating unless above 3/1000 part of 35% hydrogen peroxide (ca. 0.1% $H_2O_2$) was added to the medium.

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## Part VII. The complete prevention of putrefaction of sake by hydrogen peroxide.

By Masakazu YAMADA, Hisao MATUI, and Tokuitiro ŌHASI.

Salicylic acid is permitted to be added to the limit of 0.02% to saké as an antiseptic, but the putrefaction of saké can not be prevented completely with such a quantity. Especially when saké is diluted with water to make it congenial to the taste, it is more apt to putrefy. On account of this fact brewers in Japan have always suffered a serious loss. We succeeded in the complete prevention of the putrefaction of saké by the addition of hydrogen peroxide under the following conditions.

As we stated in a previous paper (see Part IV.), saké has catalase which destroys in a few hours one thousandth part of 35% hydrogen peroxide added to saké. And yet if a large quantity of hydrogen peroxide is added to destroy the catalase, the quality of saké shows a marked fall and becomes unsuitable to drink. Therefore we must first destroy the catalase in saké by the method we reported in Part IV.

Let about 4 mg of hydrogen peroxide be contained in 100 cc of saké, and saké putrefies no more even if it is diluted with water to 65%.

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## Part VIII. On the application of hydrogen peroxide for the preservation or the refining of beverages or brewages.

By Hisao MATUI and Masakazu YAMADA.

As we have previously mentioned (see Part VI and Part VII.), hydrogen peroxide prevents the propagation of micro-organisms and so it can be used as an antiseptic for saké. Moreover as it has the decolourizing and deodorizing power, there may be room for the application of it to beverages or brewages in general.

We investigated the influence of hydrogen peroxide upon the following various kinds of beverages or brewages.

1. When hydrogen peroxide is added to syōyu (soy-sauce), the syōyu foams at once and is soon decolourized extraordinarily, but gives out a bad smell simultaneously. The bad smell is derived from aldehydes which come from oxidation of amino acids in syōyu by hydrogen peroxide. On the other hand, hydrogen peroxide added to syōyu is gradually decomposed by catalase in syōyu or by

mutual reaction with such substances as amino acids. Thus it was shown that hydrogen peroxide was quite inadequate to be used as rectifying agent or antiseptic for syōyu.

2. The amino acids mixture prepared from vegetable proteins and used as seasoning behaves like syōyu to hydrogen peroxide. Gradual decomposition of hydrogen peroxide occurs producing various aldehydes or bad smell.

3. When one thousandth part of 35% hydrogen peroxide is added to natural vinegar, the smell of bacteria or diacetyl is lost, and its quality comes to resemble artificial vinegar.

4. The addition of 1/1000～4/1000 part of 35% hydrogen peroxide can prolong the time of conservation of "Calpis", tomato-ketchup, syrup of coffee, soup, unsweetened evaporated milk, bean-curd (tōhu) or vermicelli.

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## Über Endoconidiophora Fimbriata (E. et H.) Dav.

(ss. 831～835)

Von Kenji Miyaji.

(Landwirtschaftliche Hochschule zu Gifu; Eingegangen am 14. Aug. 1939.)

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## Über die Bestimmung des Glutathions in Geweben.

(ss. 836～840)

Von Akiji Fujita.

(Aus dem Biochemischen Laboratorium des Kitasato-Instituts in Tokyo; Eingegangen am 30. Aug. 1939.)

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## On the Ether Extract of the Bark of Cajuput-tree.

(pp. 841～842)

By Minoru Isii and Yasuyosi Osima.

(Department of Food Chemistry, Taihoku Imperial University, Taiwan; Received Aug. 30, 1939.)

Cajuput-trees (*Melaleuca leucadendron* Linn.), the trunks of which are covered with a bark of soft spongy layers, are widely planted in Formosa.

From the ether extract of the bark, which amounted to twenty per cents of the material, we separated a new resinol melting at 304°C. It was composed of C 10.51%, H 78.42% and was confirmed as $C_{28}H_{45}O_3$. We named this new resinol "Melaleucin". By the acetylation of melaleucin, monoacetyl-melaleucin mp 280°C, $C_{30}H_{47}O_4$, was obtained.

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# On the Hydrolysis of Fats and Fatty Acid Esters. (I)

(pp. 843～856)

By Toyoki Ono.

(Chemical Laboratory of the Fish Meal Association of Japan;
Received Aug. 21, 1939.)

Studies on the hydrolysis of fats and esters have been made by many scientists, but have not yet given satisfactory results in regard to the mechanics of the enzymic hydrolysis on the substances above mentioned.

I attempted, therefore, to observe systematically the following subjects:

(1) Influence of temperature on the saponification of fats, oils, and esters.
(2) Influence of temperature on the enzymic hydrolysis of fats, oils, synthetic glycerides and esters.
(3) Examination of the intermediate products in the course of hydrolysis.
(4) Hydrolysis by means of organisms.
(5) Isomerism on hydrolysis.

## I. Influence of Temperature on the Saponification of Fats and Oils.

Twenty-eight fats and oils were taken as samples from plant and animal sources, and the saponification was carried out in the homogenous medium consisting of benzol and alcoholic alkali solution.

Table I shows the "Rate of Reaction Velocity" at temperature between 30° and 10°C. $K$ (reaction velocity coefficient) was calculated from the equation,

$$K=\frac{2.3025}{T_e t}\log\frac{T_t(T_0-T_e)}{T_0(T_t-T_e)}$$

where, $t$···time (in minute) on saponification.

$T_0$···C. C. of HCl required for neutralising free alkali before the saponification begins.

$T_e$··· 〃 〃 〃 〃
after the saponification was finished.

$T_t$··· 〃 〃 〃 〃
after time "$t$".

### Results

1. At lower temperature, the fish oils, especially whale oil, are sttacked more strongely by alkali than the vegetable ones.
2. Such solid fats as cacao butter, cocoa nut oil, and butter fat are very rapidly hydrolysed at 30°C compared with oily fats.
3. At the beginning of saponification, the reaction velocity at 30°C is large through all fats, but between 40 and 180 minutes it is constant, and then after 3 hours it diminishes.

Table I. The Rate of Saponification Velocity ($K_{t+10}$ : $K_t$)

| | Whale Oil | Sardine Oil | Salmon Oil | Trout Oil | Shark Liver Oil | Cod Liver Oil | Alaska-Pollack Liver Oil | Sperma-ceti | Lard | Beef Tallow | Butter Fat | Chicken Fat |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $K_{t_1}$ : $2\times K_{t_2}$ | 2.33 | 2.38 | 2.10 | 2.82 | 2.20 | 2.06 | 2.39 | 2.65 | 2.71 | 2.56 | 3.27 | 2.45 |
| $K_{t_2}$ : $K_{t_3}$ | 2.48 | 2.27 | 2.36 | 2.70 | 2.85 | 2.19 | 2.80 | 2.01 | 2.21 | 2.91 | 2.70 | 2.67 |
| $K_{t_3}$ : $K_{t_4}$ | 1.64 | 2.33 | 2.13 | —— | —— | —— | —— | —— | 3.23 | —— | —— | 2.24 |
| | Perilla Oil | Tsubaki Oil | Linseed Oil | Peanut Oil | Olive Oil | Soya Bean Oil | Castor Oil | Cocoa-Nut Oil | Japan Wax (Crude) | Japan Wax (Re-fined) | Cacao Butter | Rape Oil |
| $K_{t_1}$ : $2\times K_{t_2}$ | 2.48 | 3.08 | 2.33 | 2.54 | 2.46 | 2.85 | 2.85 | 3.21 | 1.98 | 2.23 | 2.45 | 2.33 |
| $K_{t_2}$ : $K_{t_3}$ | 2.67 | 2.40 | 2.55 | 2.59 | 2.90 | 2.75 | 2.70 | 3.51 | 2.27 | 2.32 | 3.43 | —— |
| $K_{t_3}$ : $K_{t_4}$ | 3.20 | —— | —— | —— | —— | —— | 2.05 | 3.13 | —— | —— | 5 00 | —— |

$K_{t_1}$, $K_{t_2}$, $K_{t_3}$ and $K_{t_4}$ indicate the reaction velocity coefficient at 30°C, 10°C, 0°C and −10°C.

## Chemical Studies on the Kikyo-root. (Report VIII)

### On the Constitutional Formula of Platycodigenin (Kikyo-Sapogenin). (No. 1)

(pp. 857～861)

By M. Tsujimoto and R. Senju.

(Agr. Chem. Laboratory, Kyushu Imp. Univ. and Agr. Chem. Laboratory, Kagoshima Imp. College of Agr. and Forestry;
Received Aug. 10, 1939.)

Summary.

(1) Crude platycodigenin. It is a light yellow crystalline powder which is accompanied with resinous and colouring matters.

(2) Purification. The following two processes were applied.

1. K-Salt of platycodigenin was separated in a pure crystalline form, then the salt was decomposed by HCl and free platycodigenin was obtained in a pure state.
2. The chromatographic adsorption analysis was applied. We made use of $Al_2O_3$ (adsorbent) and acetone (eluent) in this experiment. Platycodigenin was adsorbed in the upper layer.

(3) General properties. Colourless needle or prismatic Crystals. mp=242～243°C. Soluble in methanol, ethanol, glacial acetic acid, acetic anhydride and acetone; difficultly soluble in chloroform; insoluble in water, ether, benzen and petroleum ether. $[\alpha]_D^{31.7} = +59.45°$. Unsaturated monobasic acid. Liebermann's sterin reaction possitive.

## Chemical Studies on the Kikyo-root. (Report IX)

On the Constitutional Formula of Platycodigenin (Kikyo-Sapogenin). (No. 2)

Determination of the Molecular Weight of Platycodigenin.

(pp. 862～864)

By M. Tsujimoto and R. Senju.

(Agr. Chem. Laboratory, Kyushu Imp. Univ. and Agr. Chem. Laboratory, Kagoshima Imp. College of Agr. and Forestry;
Received Aug. 21, 1939.)

Summary

(1) The molecular weight of platycodigenin was determined by the titration method, Barger's method and the analysis of K-Salt. The results were as follows:—

| | | | |
|---|---|---|---|
| Titration method | 516 | Titration method (Micro-Pregle) | 532 |
| Barger's method | 520 | Analysis of K-Salt | 540 |
| Mean | 527 | Calc. for $C_{30}H_{48}O_7$ | 520 |

(2) The elementary analysis of platycodigenin was as follows:—

| | C (%) | H (%) |
|---|---|---|
| Experiment | 69.45 | 9.17 |
| Calc. for $C_{30}H_{48}O_7$ (=520) | 69.23 | 9.23 |

From the above results, it was concluded that platycodigenin has the formula $C_{30}H_{48}O_7$ and the molecular weight of 520.

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## Phosphoric Acid Absorbtion of Soils in Tyosen.

(pp. 865～870)

By Misu-Hideo.

(Agricultural Experiment Station, Government General of Tyosen;
Received Aug. 28, 1939.)

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## Über das Vorhandensein der β-Oxyglutaminsäure im Shoyu (Japanische Sojasauce).

(ss. 871～875)

Von Yukio Tomiyasu.

(Aus dem Agrikulturchem. Laboratorium der Kaiserl. Kyushu Universität, Fukuoka; Eingegangen am 12. Aug. 1939.)

35 L Shoyu wurden unter vermindertem Druck auf etwa die Hälfte konzentriert, um es von dem reichlichen Eiweißkoagulum und vom Kochsalz zu befreien, der Rückstand wurde vorerst mit basischem Bleiacetat, dann mit Phosphorwolframsäure behandelt. Das Filtrat wurde mit Bariumhydroxyd neutralisiert, und der dabei sich bildende Niederschlag mit 1%iger Salzsäure nach der Vorschrift von Gulland und Morris (J. Chem. Soc., 1644, 1934) eluiert. Diese Behandlung wurde

dreimal wiederholt. Darauf wurde die Lösung im Vakuum zu Sirup eingeengt, und die darin enthaltenden Monoaminodicarboxylsäuren wurden als Bariumsalz nach Jones und Moeller (J. Biol. Chem., **79**, 429, 1928) in dessen alkoholischer Lösung ausgeschieden. Daraus wurde Glutaminsäure als salzsaures Salz abgetrennt, und dann das Filtrat zum Sirup eingeengt. Der Sirup wurde mit Chloramin T oxydiert und daraus ein dunkelrotes *p*-Nitrophenylosazon vom Schmelzpunkt 298°C gewonnen, das 22,05%igen Stickstoff enthielt. Eine Spur dieses Osazons zeigte charakteristische Blaufärbung in der alkoholischen Natronlauge. Diese Substanz stimmt also mit dem *p*-Nitrophenylosazon von Äpfelsäurehalbaldehyd überein. Somit ist der Nachweis geliefert, dass β-Oxyglutaminsäure im Shoyu vorhanden ist.

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## On the Enzymic Action of Nncleotid-like Substances.

(pp. 876～878)

By Tetutaro Tadokoro and Naomoto Takasugi.

(Hokkaido Imperial University, Received Sept. 4, 1939.)

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## The Chemical Investigation of the Oil of *Setaria italica* Beauv.

(pp. 879～884)

By Hannemon Ito.

(The Gifu Agricultural College; Received Aug. 30, 1939.)

The material employed in this investigation was produced in Gifu Prefecture in 1927 and 1935.

33 kilograms of ground material, on extraction by continuous percolation with hot ether, yielded one kilogram of oil.

Some constants of the natural oil were determined, with the following results:

| | Glutinous | Common |
|---|---|---|
| Specific gravity (15°C) | 0.9195 | 0.9193 |
| Refractive index (30°C) | 1.4710 | 1.4710 |
| Acid value | 51.95 | 41.94 |
| Saponification value | 164.03 | 159.60 |
| Iodine value | 131.82 | 105.07 |
| Hehner value | 93.40 | 94.45 |
| Reichert-Meissl value | 0.43 | 0.48 |
| Polenske value | 1.3 | 1.4 |
| Acetyl value | 33.14 | 31.37 |

The contents of unsaponifiable matters and solid and liquid fatty acids in the oil were determined with the following results:

| | Unsaponifiable matters % | Solid fatty acids % | Liquid fatty acids % |
|---|---|---|---|
| Glutinous | 2.13 | 17.40 | 72.45 |
| Common | 2.39 | 15.05 | 70.03 |

Some constants of solid and liquid fatty acids were measured as follows:

Liquid fatty acids.

| | Neutralisation value | Mean molecular weight | Iodine value | Refractive index (30°C) |
|---|---|---|---|---|
| Glutinous | 203.76 | 275.37 | 121.48 | 1.4690 |
| Common | 203.41 | 275.84 | 98.64 | 1.4679 |

Solid fatty acids.

| | Neutralisation value | Mean molecular weight | Iodine value | Melting point |
|---|---|---|---|---|
| Glutinous | 214.27 | 261.85 | 25.98 | 22~26° |
| Common | 210.09 | 267.06 | 22.77 | 22~26° |

From the solid fatty acids, palmitic acid and carnaubic acid were isolated.

Liquid fatty acids were composed largely of oleic, linolic and isolinolic acids.

From the unsaponifiable matters, a phytosterol, melting at 139~40°C, with $[\alpha]_D^{20} = -22.1$, was isolated. Its acetate melted at 122~4°C with $[\alpha]_D^{20} = -27.7°$.

From the unsaponifiable matters, besides a phytosterol, squalene was obtained.

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## The Chemical Investigation of the Oil of *Phaseolus vulgaris* L.

(pp. 885~890)

By Hannemon Ito.

(The Gifu Agricultural College; Received Aug. 30, 1939.)

The material employed in this investigation was produced in Hokkaido in 1932, and was ground by means of a stone mill. 16 kilograms of the ground material (moisture 13.0 per cent.), on extraction by continuous percolation with hot ether, yielded 195 grams of oil.

Some constants of the natural oil were determined, with the following results:

| | | | |
|---|---|---|---|
| Specific gravity (15.5°C) | 0.9603 | Iodine value | 149.8 |
| Refractive index (30°C) | 1.4808 | Reichert-Meissl value | 1.03 |
| Acid value | 20.5 | Polenske value | 2.00 |
| Saponification value | 132.6 | | |

The contents of unsaponifiable matters and solid and liquid fatty acids in the natural oil were determined with the following results:

Solid fatty acids 19.0 per cent, liquid fatty acids 63.3 per cent., unsaponifiable matters 7.0 per cent.

Some constants of solid and liquid fatty acids were measured as follows:

| | Specific gravity. (12°C) | Refractive index. (30°C) | Neutralisation value. | Iodine value. |
|---|---|---|---|---|
| Liquid fatty acids | 0.9322 | 1.4718 | 186.8 | 156.6 |
| Solid fatty acids | — | — | 199.6 | 33.9 |

Solid fatty acids were considered to consist chiefly of palmitic acid and carnaubic acid but the former greatly predominating. Liquid fatty acids were composed largely of oleic, linolic, and linolenic acids.

The unsaponifiable matters were treated with alcohol to divide roughly into

two parts, one easily and the other difficultly soluble in alcohol. Each of them was recrystallised from alcohol several times and a substance melting at 137～8°C, with $[\alpha]_D^{27} = -33.6$ was obtained from the part easily soluble in alcohol, while from the difficultly soluble part a substance melting at 151～3°C, with $[\alpha]_D^{18} = -45$ was isolated. These substance were assumed to show the usual phytosterol colour reaction, but the analytical results proved that the contents of the carbon atom were about one per cent. less than the phytosterol. The emperical formula from their analytical data, however, was close to $C_{20}H_{36}O$, $C_{21}H_{38}O$ or $C_{21}H_{36}O$. The melting point and the specific rotatory power of the substance melting at 137～8°C were 132～3°C. and −45.4 at 22°C., and those of the substance melting at 151～3°C were 137～8°C. and −74.4 at 20°C.

## Über die Enzyme des Reismalzes.



Von H. Munakata.

(Aus der Agrikult. Chem. Labor., Kaiserl. Univ. zu Tokio;
Eingegangen am. 7. Aug. 1939.)

## Untersuchungen über Vitamin C in Obstsaftfabrikaten I.

### Einfluß des Unterschiedes der Herstellung und der Sterilisationsmethode auf den Vitamin C-Gehalt in Tomatensaft in Büchsen.



Von Choten Inagaki.

(Lebensmittelchemisches Forschungsinstitut der Meiji Zuckerindustrie.
Eingegangen am 30. Aug. 1939.)

Es werden Untersuchungen ausgeführt über den Vitamin C-Gehalt mit 5 Tomatensaftbüchsen von in- und ausländischen Waren.

Nach der titrimetrischen Methode mit 2,6 Dichlorophenol-Indophenol zeigt sich der Vitamin C Gehalt in allen ausländischen Waren 3 bis 5 mal so groß als der in inländischen. Die Askorbinsäure im frischen Tomatenfleisch beträgt 21,5 mg% und die in Schale und Samen 27,9 mg%.

Durch wiederholte Untersuchungen wurde die Existenz der Askorbinsäureoxidase in frischen Tomaten bestätigt.

Die Askorbinsäureoxidase in Tomaten wird durch 10 Minuten langes Erhitzen auf 65°C vollkommen zerstört.

Weiter wurde die Beziehung zwischen der Askorbinsäure und der Askorbinsäureoxidase untersucht, sowie die Herstellung von Tomatensaft in Büchsen reich an Vitamin C und die beste Sterilisationsmethode zur Aufbewahrung.